

SHTARK, M.B.

Electrical activity of different segments of the brain in hibernators. Fiziol. zhur. 49 no.8:943-951 Ag '63.

(MIRA 17:2)

1. From the Laboratory for Clinical and Experimental Physiology, Psychoneurological Research Institute, Odessa.

SHTARK, M.B.

Histochemistry of glycogen in the brain of hibernating  
animals. Dokl. AN SSSR 153 no.5:1216-1219 D '63.

(MIRA 17:1)

1. Odesskiy nauchno-issledovatel'skiy psikhonevrologicheskiy  
institut. Predstavleno akademikom A.V. Palladinym.

\*

MARINESCU, G.; STARK, M.; MARCOVICI, A.; COPELOVICI, Y.; RADULESCU, A.

Encephalomyelitis caused by a double poliomyelitis and mumps infection. Stud. cercet. inframicrobiol. 14 no.1:23-29 '63.

1. Comunicare prezentata la cel de-al II-lea Simposion romino-bulgar asupra encefalitelor actuale, Sofia.

(ENCEPHALITIS) (MUMPS) (POLIOMYELITIS)

AFANAS'YEV, Yu.Kh. [Afanas'iev, IU.Kh.]; SHTARK, M.B.; KOLIK, A.M. [Kolik, L.M.]

Electrophysiological and "behavioral" characteristics of narcoleptic paroxysm. Fiziol. zhur. [Ukr.] 10 no.2:206-214 Mr-Apr '64.  
(MIRA 18:7)

1. Laboratoriya klinicheskoy i eksperimental'noy elektrofiziologii i otdel klinicheskoy neyrovegetologii Odesskogo psikhonevrologicheskogo instituta.



SHTARK, M.B.

Bioelectrical activity of the brain in selective hypothermia. Pat.  
fiziol. i eksp. terap. no.2:55-60 '64. (MIRA 17:9)

1. Laboratoriya elektrofiziologii Gorodskoy bol'nitsy No.21 v Permi  
i Odesskiy nauchno-issledovatel'skiy psikhonevrologicheskiy institut.

L 27930-66 EWT(1) SCTB DD

ACC NR: AP6017751

SOURCE CODE: UR/0221/65/060/003/0384/0410

AUTHOR: Shtark, M. B. (Odessa)

ORG: none

TITLE: Physiological mechanisms for regulating the hibernation of mammals

SOURCE: Uspekhi sovremennoy biologii, v. 60, no. 3, 1965, 384-410

TOPIC TAGS: blood circulation, hibernation, biologic respiration, hypoxia, central nervous system, endocrinology

ABSTRACT: Soviet and non-Soviet literature as late as 1964 is reviewed. The bibliography contains around two hundred items, most of them non-Soviet. The article's principal divisions are: Contemporary Methods of Studying Physiological Processes in the Organism of Hibernating Mammals; Blood Circulation, Activity of the Heart, Regulation of Cardiac Activity and Vascular Tonus, and Regional Characteristics of Blood Circulation; Respiration, External Respiration, the Respiratory Function of the Blood and Tissue Respiration, Nervous and Humoral Regulation of Respiration, and Hypoxia in Hibernants; Heat Regulations; the Endocrine System, Hormone Factors and Sleep Regulation, and the Pituitary -- Hypothalamus -- Adrenal Cortex System and the Sleep Mechanisms; Activity of the Central Nervous System and Coordination of Physiological Processes in Hibernating Mammals; and the Neurochemistry of Torpidity and Waking of Hibernating Mammals. Orig. art. has: 8 figures. [JPRS]

SUB CODE: 06 / SUBM DATE: none / ORIG REF: 037 / OTH REF: 120  
Card 1/1 file

1971, M.B.; DANILYCH, I.I.

Dendrite potentials of the cerebral cortex in hibernating mammals. Biol. eksp. biol. i med. 59 no.2:12-15 F '65.

(MIRA 18:7)

1. laboratoriya elektrofiziologii (zav. - kand. med. nauk M.B. Shtark) Psikhonevrologicheskogo instituta (dir. - A.G. Ieshchenko), Odessa.

4 SHTARK P.A.

Country : USSR  
Category : Soil Science. Physical and Chemical Properties of Soils.  
Abs Jour : KhBiol., No 6, 1959, No 24611  
Author : Batalin A. Kh.; Bockanova, Ye. S.; Popova, A. A.; Sidorova, I. V.; Filimonova, A. U.; Kuznetsov, N. I.; Shtark, P. A.  
Inst : All-Union Chemical Society Inst. D. I. Mendeleev  
Title : The Contents of Boron, Cobalt, Copper, Molybdenum, Nickel, Manganese and Fluorine in Certain Soils of the Gorchinsky Rayon in Chkalovskaya Oblast.  
Orig Pub : Vest. Chkalovskogo obl. otd. Vses. khim. o-va im. D. I. Mendeleeva, 1957, vyp. 7, 7-9  
Abstract : Determination of the microelements was conducted in the arable and subarable regions of chernozem soils under different cultivations.  
Card : 1/3

Abstract : Analyses were conducted according to the methods of the Institute of Geochemistry and Analytical Chemistry of the USSR. The contents of the microelements in the chernozem soils were: B, 0.00053-0.0017; Co, 0.0004-0.0009; Cu, 0.0002-0.0011; Mn, 0.00011-0.0036; Ni, 0.00048-0.00064; Mo, 0.0027-0.067; P, 0.0013-0.031. The quantity of the microelements in the investigated soils was determined.

Card : 2/3

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Orig Pub: 1957

Abstract : Stigated soils corresponds to their average content in the chernozem soils of the USSR.  
— M. N. Kozlovskiy

Card : 3/3

VICHEK, Ya.; SHTARK, V.

Just when shall we get new sack cleaning machines? Muk.elev.prom.23  
no.8:32 Ag '57. (MIRA 10:11)

1. Leningradskaya fabrika myagkoy tary.  
(Bagging)

SHTARKALEV, I.; ILIYEV, G. [Iliev, G.]; BELOPYTOV, B.; ATANASOV, D.

Massive medicinal prevention of hemorrhages during the placental period. Akush. i gin. 40 no.5:78-80 S-O '64. (MIRA 18:5)

1. Kafedra akusherstva i ginekologii (zav. - prof. I.Shtarkalev)  
Vysshiiy meditsinskiy institut [Vissh meditsinski institut, Sofiya,  
Bolgariya.

SHTARKAS, Ye.M. [Starkas, E.], kand.med.nauk (Vil'nyus); SHONTA, Z.P.  
[Sonta, Z.], gidrogeolog (Vil'nyus)

Sanitation intake wells for Klaipeda. Vod. i san. tekhn.  
no.8:33-34 Ag '65. (MIRA 18:12)

SHTARKAS, Ye.L., Cand Med Sci — (diss) "Sanitary Hygienic Evaluation  
of <sup>the</sup> water supply of the city of Vil'nyus." Vil'nyus, 1959. 19 pp  
(Acad Med Sci USSR). 230 copies. (KL,38-59, 120)

87



SHTARKAS, Ye.M., kand.med.nauk; IODKAZIS, V., inzhener-gidrogeolog

Utilization of infiltration waters as a source of a central water  
supply. Gig. i san. 27 no.3:64-66 Mr 62. (MIRA 15:4)  
(KAUNAS--WATER-SUPPLY)

DILYUNAS, I.P. [Diliunas, I.]; IODKAZIS, V.I. [Jodkazis, V.];  
SHTARKAS, Ye.M. [Starkas, E.], kand. med. nauk

Sanitary evaluation of the use of river water for artificial  
feeding of an intake of underground water. Gig. i san. 28  
no.7:64-69 J1 '63. (MIRA 17:1)

1. Iz Vil'nyusskogo nauchno-issledovatel'skogo instituta  
epidemiologii i gigiyeny.

SHTARKER, A. Ya.

"Photoelectric Method for the Determination of Mechanical Defects in Unexposed Cinema Film." Cand Tech Sci, Leningrad Inst of Cinema Engineers, Leningrad, 1953. (RZh Fiz, Jan 55)

Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (12)  
SO: Sum. No. 556, 24 Jun 55

SHTARKH, P. S.

Cand. Tech. Sci.

Dissertation: "Thermovulcanization of Synthetic Divinyl-Styrol Rubber GRS." Moscow  
Technological Inst of Light Industry ineni L. M. Kaganovich, 12 Jun 47.

SC: Vechniyaya Moskva, Jun, 1947 (Project #17836)

USSR/Chemistry - Synthetic Elastomers, Mar/Apr 52

Films

"The Mechanism of Formation of Films From Dispersions of High Polymers. II. Investigation of the Structure of Films From Concentrates of Natural Latex," S. S. Voyutskiy, B. V. Shtarkh, Gen Sci Res Inst of Leather Substitutes, Moscow

"Kolloid Zhur" Vol XIV, No 2, pp 77-84

The kinetics of wetting of films of Revertex in water were investigated. Depending on the state of dispersion and the conditions of film formation different Revertex film structures can be obtained. The structure can either be closed, representing a

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continuous rubber phase with stabilizer dispersed in it, or an open structure representing 2 intermeshed networks or polymer and stabilizer. Increasing the temp of film formation favors closed structures, decreasing it leads to formation of open structures. Films obtained from Revertex solns in benzene have closed structure.

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SHTARKH, B. V.

SHTARKH, B. V.

Chemical Abst.

Vol. 48 No. 9

May 10, 1954

General and Physical Chemistry

4

Mechanism of formation of films from dispersions of  
polymers. II. Structure of films from concentrates of nat-  
ural latex. S. S. Voyutskij and B. V. Shtarkh. *Colloid J.*  
(U.S.S.R.) 14, 85-91 (1952) (Engl. translation).—See C.A.  
46, 5835g. III. Effect of the emulsifier on film formation.  
*Ibid.* 345-52.—See C.A. 47, 2014b. H. L. H.

11-9-54  
muk

(2)  
Chem

1. VOYUTSKIY, S. S.: SHTARKH, B. V.
2. USSR (600)
4. Emulsions
7. Formation mechanism of films from dispersions of highly polymerized substances.  
Part 3. Influence of emulsifier on film formation. Koll.zhur. 14 No. 5, 1952.
9. Monthly List of Russian Accessions, Library of Congress, January 1953. Unclassified.

VOYUTSKIY, S.S.; SHTARKH, B.V.; REBINDER, P.A., akademik.

Effect of the molecular weight, the form of molecules and the presence in it of polar groups, on autohesion of high polymers. Dokl. AN SSSR 90 no.4: 573-576 Je '53. (MLRA 6:5)

1. Akademiya Nauk SSSR (for Rebinder).
2. Tsentral'nyy nauchno-issledovatel'skiy institut kozhzhamentey (for Voyutskiy, Shtarkh).  
(Polymers and polymerization)



SHTARKH, B.V.

VOYUTSKIY, Sergey Sergeyevich, professor, doktor khimicheskoy nauk;  
SHTARKH, Bella Vladimirovna, kandidat tekhnicheskoy nauk; TUMARKIN,  
D.I., redaktor; POPOV, A.V., redaktor; NEKRASOVA, O.I., tekhnicheskoy  
redaktor

[Physics and chemistry of film formation processes in high polymer  
dispersion] Fiziko-khimiya protsessov obrazovaniya plenok iz dispersii  
vysokopolimerov. Moskva, Gos. nauchno-tekhn. izd-vo Ministerstva  
promyshl. tovarov shirokogo potrebleniya SSSR, 1954. 174 p. (MLRA 8:3)  
(Films (Chemistry))

USSR.

1811. Autohesion of high polymers. III. Influence of molecular weight, form of molecule, and polar groups present in the molecule. S. S. VOYURSKII and B. V. SUTARKH. *Koll. Zhur.* 1954, 16, 3-9; *Chem. Abs.*, 1954, 48, 7090. Cf. abs. 1805 below. The work of peeling apart two ribbons of polyisobutylene backed by fabric increased with the time the ribbons were pressed together. After seven days (the longest time of pressing) the work was greatest at a molecular weight of the polyisobutylene of 100,000, and was less at both 20,000 and 200,000. When pressing was carried out at higher temperatures the work of peeling was greater. The apparent energy of activation was calculated to be 2390 cal, independently of the molecular weight. For linear butadiene polymers the work was less than that for branched butadiene polymers, after pressing at 20° C, but greater after pressing at 80° C. For butadiene-acrylonitrile copolymers the work was greater, the smaller the percentage of acrylonitrile, but increased more rapidly with temperature of pressing, the greater this percentage. For smoked sheet rubber the work was increased if the rubber was previously heated at 100° C, while vulcanization for increasing periods first gave an increase, and then a rapid decrease, in the work. The work of peeling is found to depend on the rate of diffusion of the polymer.

SHTARKH, B.V.

The mechanism of film formation from dispersions of high polymers in solvents is discussed. The physical processes occurring during the formation of films from dispersions of high polymers in solvents are discussed. The films were produced either (type A) by evaporation of the solvent or (type B) by dissolving type A films in a solvent (usually CCl<sub>4</sub>) and evaporating the solvent. For A films, the tensile strength  $P$  decreased or increased when the amount of stabilizer increased; a decrease occurred on adding Na oleate to latex DBK50-70 (a synthetic latex) while NH<sub>4</sub> caseinate raised the  $P$  (and slightly lowered the total elongation) of "revertex" (natural rubber). The  $P$  of synthetic A films was greater, the higher was the temp. (0-100°) at which the film was cast, while the  $P$  of B films (of synthetic rubber SKS-30) was almost independent of this temp.; thus the temp. of casting affected  $P$  because it affected the film structure (e.g., the degree of coalescence of globules) rather than the rubber itself. On the contrary,  $P$  of revertex had a max. when the films were cast at 20-40° because of chem. degradation of the natural rubber net. In at higher temp. The modulus  $E$  of elasticity of revertex films had a min. near the double extension, and the  $E$  of B films was greater than that of A films; the relaxation of stretched B films was more rapid than that of A films. The  $E$  of SKS-30 films decreased to zero when extension increased; both  $E$  and the rate of relaxation were almost identical for A and B films.

J. J. Bikerman

SHARKH, B.V.

USSR.

The mechanism of film formation from dispersions of  
high polymers. VI. Relation between the physico-  
mechanical properties and the structure of dispersion films.  
G. B. Voronikh and B. V. Sharkh. *Colloid J. U.S.S.R.*  
10: 101-4 (1948) (English translation). See C.A. 48, 8622c.  
H.L.H.

Shtarkh, B.V.

USSR/Chemical Technology - Chemical Products and Their  
Application - Leather. Fur. Gelatin. Tanning Agents.  
Technical Proteins.

I-29

Abs Jour : Referat Zhur - Khimiya, No 9, 1957, 33133

Author : Shtarkh, B.V., Pisarenko, A.P.

Inst :  
Title : Electron Microscopic Study of Materials Used in the  
Manufacture of Synthetic Leather.

Orig Pub : Legkaya prom-st', 1956, No 5, 27-30

Abstract : The work was conducted with an electron microscope of EM-3  
type which permits magnification of up to 25 thousand ti-  
mes. Various impregnating and adhesive agents were inves-  
tigated (latices, dispersions and emulsions of high-poly-  
mers), rubbers, powders, carbon black. A drop of the dis-  
persion was placed on a collodion-film support fastened to  
a brass screen. The screen was placed into camera of the  
electron microscope. On carrying out a comparison of a

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SOV/138/58-5-3/9

AUTHORS: Pisarenko, A.P.,  
Shtarkh, B.V.

TITLE: Investigations on the Micro-Heterogeneity of Synthetic  
Rubbers (K voprosu mikroheterogenosti sinteticheskikh  
kauchukov)

PERIODICAL: Kauchuk i Rezina, 1958,<sup>17</sup> Nr 5, pp 10-13 (USSR)

ABSTRACT: Sodium butadiene rubbers are polymer homologues which have varying molecular weight (Refs.1 and 2). The molecular weight and the distribution curve of the molecular weight cannot characterize fully the properties of the rubbers as they do not show the length of their molecular chains. Various methods for processing and treatment of SKB are quoted (Refs.3-5). A.P.Pisarenko and others (Refs.6 and 7) showed that it was possible to observe in SKB solutions sol-gel fractions with the aid of an electron microscope (Fig.1A-C). An electron microscope was also used during the investigations of the micro-heterogeneity of rubber solutions (sodium butadiene, natural and butadiene-nitrile rubber, nitro cellulose VV and some types of polyamides). By varying the concentration

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SOV/138-58-5-3/9

Investigations on the Micro-Heterogeneity of Synthetic Rubbers

of solutions it was possible to change the thickness of the samples from 200 - 800 Å. Electron microscope investigations of solutions of sodium butadiene, natural and butadiene-nitrile rubbers gave results which did not agree with literature data (Refs.6 and 7). The shapes and configurations for natural rubber (Fig.2A-C) can be explained by the globular nature of this rubber. This can be confirmed by comparing micro-photographs of these rubbers and natural latex (Fig.3A-C). Fig.4A-C: micro-photographs for sodium butadiene rubber. The heterogeneity of butadiene-nitrile rubber solutions is shown in Fig.5A-C for SKN-18, Fig.6A-C for SKN-26, Fig.7A-C for SKN-40. A Yurzhenko (Ref.8) showed that during the process of emulsion polymerisation the size of the rubber globules is very much smaller than those of emulsified droplets of the monomer. Electron-micro-photographs of nitrocellulose solution: Fig.8A and of various polyamide solutions: Figs.8B and C. The micro-heterogeneity influences to a large degree the

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SOV/138-58-5-3/9

Investigations on the Micro-Heterogeneity of Synthetic Rubbers  
properties of synthetic textiles made from polyamides  
and the quality of various coatings made from  
nitrocellulose and polyamides. The electron  
microscope can, therefore, be used for the control  
of the raw materials. There are 8 figures and  
8 Soviet references.

ASSOCIATION: Vsesoyuznyy nauchno-issledovatel'skiy institut  
iskusstvennoy kozhi (The All-Union Scientific-Research  
Institute for Artificial Leather)

Card 3/3



SHTARKH, B.V.  
ALEKSEYENKO, V.I.; SHTARKH, B.V.

Characteristics of intermolecular bonds in combined systems. Leg.  
(MIRA 11:4)  
prom. 18 no.3:18-21 Mr '58.  
(Polymers) (Molecular association)

AUTHORS: Shtarkh, B.V.; Pisarenko, A.P.

69-20-3-22/24

TITLE: ~~Electron-Microscopic Investigation of the Plasticization~~  
Electron-Microscopic Investigation of the Plasticization  
Process of Dispersion of Vinyl Chloride and Vinylidene Chloride Copolymer (Elektronno-mikroskopicheskoye issledovaniye protsessa plastifikatsii dispersii sopolimera khloristogo vinila i vinilidenkhlorda)

PERIODICAL: Kolloidnyy zhurnal, 1958, vol XX, Nr 3, pp 395-396 (USSR)

ABSTRACT: In the production of artificial leather and other products, different water dispersions of high polymers are used. Many other substances are added to these dispersions, e.g. plasticizers. A vinyl chloride and vinylidene chloride copolymer dispersion, with dibutylphthalate as plasticizer, has been studied by means of the electron microscope EM-3, the magnification being 7,500 diameters. The different stages of interaction between the employed substances is shown in the photos. Photo 1 is the control test. Photo 2 shows the droplets with their spilt contours. The other photos show the effect of the plasticizer after 10, 20, 30, 60 days, or thermal processing of the samples. Plasticization over a long period or a short heating increases the effect of the low-molecular plasticizer dibutylphthalate.

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69-20-3-22/24

Electron-Microscopic Investigation of the Plasticization Process of a Dispersion of Vinyl Chloride and Vinylidene Chloride Copolymer

There are 10 photos and 3 references, 2 of which are Soviet and 1 English.

ASSOCIATION: Tsentral'nyy nauchno-issledovatel'skiy institut promyshlennosti zameniteley kozhi, Moskva (Central Scientific Research Institute of the Industry of Leather Substitutes, Moscow)

SUBMITTED: August 16, 1957

Card 2/2  
1. ~~Compounds—Applications~~ 2. ~~Electronmicroscope—Applications~~  
3. ~~Water—Dispersion~~ 4. ~~Plasticizers—Applications~~

5(4)

SOV/69-21-3-11/25

AUTHORS: Kurdubov, Yu.F., Pisarenko, A.P., Rubina, S.I., Shtarkh,  
B.V.

TITLE: Lignin as a Reinforcing Agent of SKS-30 Rubber

PERIODICAL: Kolloidnyy zhurnal, 1959, Vol XXI, Nr 3, pp 306-308  
(USSR)

ABSTRACT: The authors report on a study of the properties of vulcanizates, each containing a variety of activated lignin. The lignin varieties used for the experiments were powdered and ground with the vibromill, chloro- and alkali-activated. Vulcanizates containing alkali-activated lignin were mostly reinforced. Electron microscopic investigation revealed that coagulation of alkali-activated lignin results in the formation of a reticular structure, which is similar to the structure of carbon black. This structure, which could not be seen in the other varieties, evidently accounts for the reinforcing effect of alkali-activated lignin. The authors mention the Soviet scientists N.N. Shory-

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Lignin as a Reinforcing Agent of SKS-30 Rubber

SOV/69-21-3-11/25

gina, S.I. Sukhanovskiy and M.I. Chudakov, who developed methods to activate lignin obtained by hydrolysis. They further refer to M.L. Morgulis, who investigated the dispersing effect of mechanical forces during the processing of lignin in vibromills. There are 6 electron microscopic photographs and 7 references, 6 of which are Soviet and 1 English.

ASSOCIATION: Nauchno-issledovatel'skiy institut plenochnykh materialov i iskusstvennoy kozhi, Moskva (Scientific Research Institute of Pellicular Materials and Synthetic Leather, Moscow)

SUBMITTED: 30 December, 1957

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69467  
S/069/60/022/02/015/024  
D034/D002

15.9200  
AUTHORS: Shvetsov, V.A., Pisarenko, A.P., Shtarkh, B.V.,  
Novikov, A.S.

TITLE: An Electron Microscopic Study of the Structures of  
Reinforced Rubbers

PERIODICAL: Kolloidnyy zhurnal, 1960, Vol XXII, Nr 2, pp 233-236  
(USSR)

ABSTRACT: The authors report on the results of an electron microscopic study of the structuration of silicate and aluminate fillers in rubbers of the type SKN-18 and SKN-26. The silicate fillers were obtained from sodium silicate and calcium chloride silicate, the aluminate fillers - from the carbonates of sodium and aluminum sulfate. The study, which was carried out with an electron microscope of the type EM-3 (magnification - 7500), showed in the rubber solutions

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D034/D002

An Electron Microscopic Study of the Structures of Reinforced Rubbers

the presence of sol and gel rubber fractions and of loose coagulation structures of the fillers (see electron microscopic photographs on insert). The dispersity of the elementary particles of aluminates fillers is more pronounced than the dispersity of silicate fillers; the visibility of the particles is near the limit of the resolving capacity of the electron microscope. On the whole it could be shown that high dispersity, low aggregation tendencies and the ability to form loose network and chain coagulation structures on the part of the fillers are highly important factors in the reinforcement of rubbers. The authors mention B. Dogadkin and collaborators [Ref. 2], who showed that the main reinforcing action of hydrocarbon blacks consists in the formation of chain and network structures in the

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D034/D002

An Electron Microscopic Study of the Structures of Reinforced Rubbers

rubber mixtures. A.P. Pisarenko and collaborators [Ref 5] (in agreement with P.A. Rebinder and his school) showed that the participation of surface-active substances (additives) in the formation of mineral fillers determines basic characteristics of the fillers, as high dispersity and the ability to form chain and network structures. The authors' investigation was carried out on the lines of the results obtained by these scientists. There are 5 electron microscopic photographs on a centerfold and 9 Soviet references. ✓

ASSOCIATION: Nauchno-issledovatel'skiy institut plenochnykh materialov i iskusstvennoy kozhi, Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti;

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S/069/60/022/02/015/024  
D034/D002

An Electron Microscopic Study of the Structures of Reinforced  
Rubbers

Moskva (Scientific Research Institute of Film Ma-  
terials and Synthetic Leather, Scientific Research  
Institute of the Rubber Industry; Moscow) ✓

SUBMITTED: February 7, 1959

Card 4/4

ALEKSEYENKO, V.I.; Primal uchastiye: SHTARKH, B.V.

Swelling of compatible polymers in low molecular weight solvents.  
Plast.massy no.2:5-10 '62. (MIRA 15:2)  
(Polymers) (Solvents)

SHTARKH, B.V.; SPIRIDONOVA, V.A.; PISARENKO, A.P.

Effect of thermal treatments on the dispersity of synthetic latexes.  
Kauch.i rex. 21 no.7:8-10 J1 '62. (MIRA 15:7)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut plenochnykh  
materialov i iskusstvennoy kozhi.  
(Rubber, Synthetic)

L 13824-63

ACCESSION NR: AP300362

EPR/EWP(t)/EPF(c)/EWT(m)/BDS/ES(w)-2 AFFTC/APGC/ASD/ESD-3/SSD

S/0020/63/151/003/0634/0637

92  
85

AUTHOR: Georgiyeva, V. S.; Pisarenko, A. P.; Shtarkh, B. V.

TITLE: Modification of polymers—a technique for obtaining porous structures

SOURCE: AN SSSR. Doklady\*, v. 151, no. 3, 1963, 634-637

TOPIC TAGS: polychloroprene, poly(vinyl formal), chloroprene, vinyl formal, poly(vinyl alcohol), condensation structure formation, latex, polychloroprene latex, acetalization, gel, formaldehyde, acid catalyst, gelation, L-4, porous film, porous membrane, porous structure, polar polymer, nonpolar polymer, condensation network, coagulation network, synthetic leather, synthetic fiber

ABSTRACT: Polychloroprene-poly(vinyl formal) porous films have been prepared by the technique of condensation-[network-]structure formation (N. V. Mikhaylov and P. A. Rebinder, Koll. zhurn., 18, no. 2, 107 (1955)). A small [unspecified] amount of poly(vinyl alcohol) (PVA) in aqueous solution was added to polychloroprene (PCP) latex. The PVA formed a coagulation network, and a gel resulted. Acetalization of a film of the gel with formaldehyde in the presence of an [unspecified] acid [catalyst] resulted in a stiff condensation network of poly(vinyl formal) (PVF), forming a porous structure. The critical factors

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L 13824-63

ACCESSION NR: AP3003862

in this process were component ratio, gelation time, and degree of dehydration prior to acetalization and acetalization conditions. The porosity, strength, and elasticity of the porous structure can be controlled by varying gelation time. The degree of acetalization is greatly affected by the temperature and time of acetalization and by the type and concentration of acid [catalyst] used [data not given]. Films based on I-4 latex and PVA and having a good microporous structure were obtained. The films demonstrated the following wide range of properties: apparent specific gravity, 0.40–1.20 g/cm<sup>3</sup>; [water] vapor permeability, 0.05–710 mg/cm<sup>2</sup> hr; water absorption, 2 hr, 3–50%, 24 hr, 3–60%; tensile strength, 10–80 kg/cm<sup>2</sup>; and elongation-at-break, 100–900%. Study of the solubility of the films in water, glacial acetic acid, and chloroform revealed that 50% of the PVF is not extracted by the acid, even at 61.2–70°C, suggesting that the network structure is due to bonds stronger than Van der Waals forces. IR spectra were compared for PVF and for PCP-PVF gels swelled in chloroform after prolonged high-temperature extraction in glacial acetic acid. A substantial number of bands characteristic of PVF were also observed in the gels, confirming the feasibility of modifying PCP by formation of a PVF phase in the system. The equilibrium modulus of PCP-PVF films (13.9 kg/cm<sup>2</sup>) sharply exceeded that of PCP-PVA (4.90) or PCP (2.15) films. It is stressed that in the manufacture of synthetic leather and fibers, the condensation-[network-]structure

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ACCESSION NR: AP3003862

formation technique makes it possible not only to produce porous structures, but also to combine polar and nonpolar polymers and to vary properties according to the desired characteristics of the end product. "The authors express their profound gratitude to P. A. Rebinder, A. B. Taubman, I. N. Vlodavets, Ya. M. Yabko, M. M. Bernshteyn, and M. P. Litovchenko for giving a number of valuable opinions during the discussion of the results." Orig. art. has: 2 figures and 2 tables. 6

ASSOCIATION: none

SUBMITTED: 08Feb63

DATE ACQ: 15Aug63

ENCL: 00

SUB CODE: CH, MA

NO REF SOV: 007

OTHER: 001

Card 3/3

L 48314-65 EWT(m)/EPF(c)/EWP(j) Pc-4/Pr-4 RM S/0138/65/000/003/0012/0015  
 ACCESSION NR: AP5008128

AUTHOR: Dinzburg, B. N.; Safraz, B. A.; Baramboym, N. K.; Shtarkh, V. V.

TITLE: The mechanism of rubber reinforcement using thermosetting resins

SOURCE: Kauchuk i rezina, no. 3, 1965, 12-15

TOPIC TAGS: rubber, thermoreactive phenolic resin, resin, strengthening

ABSTRACT: The article presents some results of an investigation of the mechanism of the interaction of butadiene-styrene rubbers with phenol-formaldehyde resins. In studying this mechanism it must be kept in mind that phenol resins and rubber are extremely multifunctional with respect to their reactivity; therefore, it may be assumed that various rubber-resins are formed. It had previously been established that there is in the oxidation products of rubber a considerable number of carbonyl, caroxyl, and other oxygen-bearing groups which apparently can affect the nature of the interaction of rubbers with phenol-formaldehyde resin. A number of samples of SKS-30 rubber were prepared with different degrees of thermooxidative rolling, and their content of peroxide, aldehyde, and carboxyl groups was determined. Electron microscope analysis showed that the particles of resin joined in

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L 48314-65

ACCESSION NR: AP5008128

complexes were spherical formations which could be broken down into two groups: a first group consisting mainly of particles with clear-cut outlines and sizes ranging from 0.15-0.20 microns, and a second group of particles with blurred edges joined in aggregates. The particles of the first group probably do not contain chemically combined rubber whereas the particles of the second group are more complex formations. Based on modern reinforcement theory and considering the data obtained it can be concluded that in the modification of butadiene-styrene rubber with phenol resins by the method of "thermosetting rubber-resin master batches," complex thermomechanicochemical processes occur which lead to the formation of various rubber-resin structures. A new modified rubber (type A) obtained as a result of the interaction of rubber with small additions of phenol resins is reinforced with specific rubber-resin fillers (types B and C) which are highly active because of the similarity of the nature of their surfaces and their ability to form high developed latticed structures. Orig. art. has: 6 figures, 1 table.

ASSOCIATION: Vsesoyuznyy nauchno-issledovatel'skiy institut plenochnykh materialov i iskusstvennoy kozhi (All-Union Scientific Research Institute of Film Materials and Artificial Leather)

Card 2/3



L 48314-65

ACCESSION NR: AP5008128

SUBMITTED: 00

ENCL: 00

SUB CODE: MT, CC

NO REF SOV: 012

OTHER: 005

Card 3/3

KORZHENEVSKIY, N.L.; DONTSOVA, Z.N.; KHASANOV, Kh.Kh., dots.;  
VASIL'KOVSKIY, N.P.; SKVORTSOV, Yu.A.; POSLAVSKAYA, O.Yu.;  
KOGAY, N.A., dots.; MAMEDOV, E.D.; AKULOV, V.V.; BABUSHKIN,  
L.N., prof.; SHUL'TS, V.L., prof.; CORBUNOV, B.V.; GRANITOV,  
I.I.; KOSTIN, V.P.; SMIRNOV, N.V., dots.; TSAPENKO, N.G.,  
dots.; DEGTYAR', V.I.; CHERNOV, P.N.; MUKMINOV, F.G.;  
SELIYEVSKAYA, A.A.; RYABCHIKOV, A.M.; DALIMOV, N.D., dots.;  
LOBACH, Kh.S.; TADZHIMOV, T.; ARKAD'YEVA, A.N.; GAL'KOV,  
Ch.V.; SHTARKLOVA, S.I.; BESSONOV, M., red.; BAKHTIYAROV, A.,  
tekhn. red.

[The Uzbek S.S.R.] Uzbekskaya SSR. Tashkent, Gos.izd-vo  
UzSSR, 1963. 483 p. (MIRA 16:8)  
(Uzbekistan)

ARZHAKOV, S.A.; RYLOV, Ye.Ye.; SHTARKMAN, B.P.

Pressure sintering of powdered polymers. Part 1: Regions where  
transparent specimens are obtained. Vysokom. soed. 1 no.9:1351-1356  
S '59. (MIRA 13:3)

(Polymers) (Methacrylic acid) (Acrylic acid)

ARZHAKOV, S.A.; RYLOV, Ye.Ye.; SHTARKMAN, B.P.

Pressure sintering of powdered polymers. Part 2: Regions of true compaction. Vysokom. soed. 1 no.9:1357-1360 S '59.

(MIRA 13:3)

(Polymers) (Methacrylic acid) (Acrylic acid)

ARZHAKEV, S.A.; RYLOV, Ye.Ye.; SHTARKMAN, B.P.

Effect of pressure on the softening temperature of polymers.  
Vysokom. soed. 1 no.9:1438 S '59. (MIRA 13:3)  
(Polymers--Thermal properties)

GUZEYEV, V.V.; MOROZOV, V.I.; SHTARKMAN, B.P.; RYLOV, Ye.Ye.

Automatic instrument for the turbidimetric titration of polymer solutions. Vysokom.soed. 1 no.12:1840-1843 D '59.

(MIRA 13:5)

(Polymers)

S/020/057  
B106/B138

AUTHORS:

Bort, D. P., Kronman, A. G., Minsker, K. S., Shtarkman, B. P.,  
and Kargin, V. A., Academician

TITLE:

Electron microscopic study of crystalline polyvinyl chloride

PERIODICAL:

Akademiya nauk SSSR. Doklady, v. 143, no. 6, 1962, 1345-1347

TEXT: Electron microscopic investigations of highly crystalline polyvinyl chloride were carried out for the first time. To prepare the specimens, one drop of a solution of the polymer in cyclohexanone was put on the surface of distilled water saturated with cyclohexanone. The resulting film was applied to a collodion base. Such specimens were crystallized by heating to 80, 100, and 120°C for different periods and were compared against amorphous specimens obtained by drying the film at room temperature. In the electron microscope specimens heated to 100°C for 30 min showed, compact formations consisting of parallel bands, the number and dimensions of which increased with heating time. In shape, they were either reminiscent of extended concertinas, crabs, claws, or macro-molecules in bundles. These bundles were sometimes bent, the bands re-

Card 1/3

Electron microscopic study...

S/020/62/143/006/015/024  
B106/B138

J. Polym. Sci., 24, 301 (1957).

SUBMITTED: January 19, 1962

Card 3/3



15.8070

39578  
S/O20/62/145/003/010/013  
B101/B144

AUTHORS: Arzhakov, S. A., Rylov, Ye. Ye., Slonimskiy, G. L., and  
Shtarkman, B. P.

TITLE: The role of thermal destruction when molding polymethyl methacrylate powder into monolithic solids

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 145, no. 3, 1962, 595 - 597

TEXT: The authors studied the conditions for the production of molded specimens of polymethyl methacrylate (PMMA) powder which do not lose their transparency when annealed at a temperature  $30^{\circ}\text{C}$  above the vitrification temperature. PMMA specimens were molded at a pressure of  $50\text{ kg/cm}^2$  and a molding temperature ( $t_m$ ) of  $100 - 250^{\circ}\text{C}$ . At  $t_m \sim 135^{\circ}\text{C}$ , the transparency decreased linearly after annealing, at  $\sim 180^{\circ}\text{C}$ , the specimen became opaque. The molecular weight of PMMA decreased above  $130^{\circ}\text{C}$  owing to thermal destruction, then it reached a minimum in the viscous - liquid state at  $170 - 180^{\circ}\text{C}$  and increased again at  $190 - 230^{\circ}\text{C}$  owing to easier recombination of macroradicals. Above  $230^{\circ}\text{C}$  decomposition of the macromolecules and

Card 1/2

The role of thermal destruction ...

S/020/62/145/003/010/013  
B101/B144

formation of gaseous monomers set in. Between 130 and 190°C, transparency decreases with the molecular weight. Conclusions: the loss in transparency is a measure for the relaxation of the grains deformed by molding. Relaxation is caused by separation of C-C bonds. Hence, increased molding pressure or inhibitor addition (0.22% diphenyl picryl hydrazine) decelerates the relaxation and impedes the production of transparent specimens. Measurement of the decrease in specimen height during annealing showed that the logarithm of the molding time depends linearly on the reciprocal temperature at which the height becomes constant. The activation energy (75 kcal/mole) thus calculated, is in good agreement with that of the C-C bond. Perfectly molded specimens are obtained at temperatures and pressures which guarantee complete relaxation. There are 4 figures.

PRESENTED: March 17, 1962, by V. A. Kargin, Academician

SUBMITTED: March 17, 1962

Card 2/2

S/020/62/145/004/015/024  
B110/B144

AUTHORS: Bort, D. N., Minsker, K. S., Okladnov, N. A., Shtarkman, B. P.,  
and Kargin, V. A., Academician

TITLE: Direct formation of secondary polyethylene structures in  
polymerization processes

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 145, no. 4, 1962, 787 - 788

TEXT: Crystalline polymer structures ranging from primary supermolecular forms (packets) to higher secondary structures were studied directly in the course of the polymerization. Polyethylene synthesized in benzene (60°C, 10 atm) with a catalytic mixture of partially chlorinated metallic Al and  $TiCl_3$  forms a layer ~ 4-5 mm thick on the Al surface. This layer consists of fibers perpendicular to the Al surface with cross stripes 1.5  $\mu$  wide. After dispersion of the fibers in water and separation of the larger particles, helical bands with distinct transverse folds (3.5-4.5  $\mu$ ) of striated structure (150 - 250  $\text{\AA}$  packets) were observed by electron microscope. This proves the stepwise development of the supermolecular structure, corresponding to the structure of the crystalline polymer phase

Card 1/2

MORCZOV, V.I.; SHTARKMAN, B.P.; RYLOV, Ye.Ye.

Disk extruder. Plast.massy no.4:56-60 '62.  
(Molding machines)

(MIRA 15:4)

MOROZOV, V.I., SHTARKMAN, B.P., RYLOV, YE.I.

Physicomechanical fundamentals of polymer processing by screwless extruders.

Report presented at the 13th Conference on high-molecular compounds  
Moscow, 8-11 Oct 62

L 31312-65 EPA(m)=2/EWT(m)/EFF(c)/EPR/EWP(j)/T=Ps-I/Pr-I/Ps-I/Pr-I-10 NW/RM  
 ACCESSION NR: AR5003887 5/0081/64/000/018/S063/S063

SOURCE: Ref. zh. Khimiya, Abs. 185344

AUTHOR: Rafikov, M. N.; Razinskaya, I. N.; Popova, Z. V.; Shtarkman, B. P.

TITLE: Evaluation of thermal stability of polyvinylchloride from the standpoint of its processing

CITED SOURCE: Tr. po khimii i khim. tekhnol. Gor'kiy, vyp. 2(8), 1963, 303-308

TOPIC TAGS: polyvinylchloride, thermal stability, solubility, latex/igelit F latex

TRANSLATION: A method has been developed for evaluation of the stability of polyvinylchloride (PVC) and for evaluation of different stabilizers with respect to their ability to prevent crystallization. "PF-special" PVC and "igelit F" latex were studied. Among stabilizers and HCl acceptors which were investigated were Pb stearate (I) and Ca stearate (II) and PVC decomposition retarders were 2, 4, 6-trihydroxybenzophenone (III), 2, 2', 4, 4'-tetrahydroxysebacophenone (IV), 2, 2', 4, 4'-tetrahydroxydiphenylacane (V) and others. For evaluating the results, the following indexes were used: decrease in solubility of PVC after processing and

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L 31312-65

ACCESSION NR: AR6003887

change in the viscosity of its melt upon heating. It was established that both methods give the same results and PVC becomes insoluble after 50 min of thermal treatment. It was shown that the ability of the stabilizer to retard the thermal dehydrochlorination of PVC does not always coincide with the ability to prevent crystallization. For instance I and II accelerate crystallization while IV retards the rate of cross polymerization. III and V retard both processes.  
L. Kotlyarevskaya.

SUB CODE: 00, TD

ENCL: 00

Card 2/2

8/190/63/005/003/017/024  
B101/B203

AUTHORS: Razinskaya, I. N., Shtarkman, B. P.

TITLE: Effect of the type of plasticization of polyvinyl chloride on its physical properties

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 5, no. 3, 1963, 393-396

TEXT: Polyvinyl chloride (PVC) was mixed with dioctyl phthalate in the ratio of 100:40 parts by weight, 1 g lead acetate per 100 g PVC was added as stabilizer, and plasticization was performed in two ways: (a) 1 hr heating in a water bath at 90°C; (b) 5 min - 1 hr rolling at 90°C. The plasticized PVC was pressed at 100 kg/cm<sup>2</sup> and 130°C, and the tensile strength  $\sigma_t$  (kg/cm<sup>2</sup>), the breaking elongation  $\epsilon$ (%), the glass transition point  $T_g$  (°C), and the activation energy AE of the viscous flow (kcal/mole) were determined. Data found for unrolled samples:  $\sigma_t = 125 \pm 5$ ;  $\epsilon = 12 \pm 4$ ;  $T_g = +35$ ; AE = 64; for rolled material:  $\sigma_t = 95 \pm 3$ ;  $\epsilon = 106 \pm 5$ ;  $T_g = -5$ ; AE = 31. Conclusions: inter-bundle plasticization occurs mainly with

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Effect of the type of...

S/190/63/005/003/017/024  
B101/B203

unrolled material, whereas in rolled material the supermolecular structures are destroyed and intra-bundle plasticization takes place. Thus the rolled material becomes more homogeneous. There are 2 figures and 1 table.

SUBMITTED: September 12, 1961

Card 2/2

L 15603-63 EWP(j)/EPF(c)/EWT(m)/BDS ASD Pc-4/Pr-4 RM/  
 WW/JW/MAY  
 ACCESSION NR: AP3004706 S/0190/63/005/008/1196/1200  
 AUTHORS: Arzhakov, S. A.; Rylov, Ye. Ye.; Slonimskiy, G. L.; Shtarkman, B. P.  
 TITLE: Peculiarities in the formation of monolithic solids under the effect of pressure and temperature on polyacrylonitrile powder  
 SOURCE: Vyssokomolekulyarnyye soyedineniya, v. 5, no. 8, 1963, 1196-1200  
 TOPIC TAGS: monolithic solid, polyacrylonitrile, pressure, temperature, plasticization of polymer  
 ABSTRACT: The present investigation was undertaken to study the formation of transparent monolithic solids from polymeric substances with rigid chains and vitrification temperatures near or above their decomposition margin. Polyacrylonitrile as such (or plasticized by vapors of dimethylformamide) was subjected to various pressures at a temperature range of 50-200C. When the state of transparency (estimated by visual means) had been reached, the corresponding pressure and temperature were recorded and plotted as log P - T. It was found that transparency in the solid state can be achieved at 140C, providing log P is 3.5, while at atmospheric pressure polyacrylonitrile would decompose at 250C before any  
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L 15603-63

ACCESSION NR: AP3004706

2

vitreous state had been reached. When subjected to compression at a temperature above 150C, powdered polyacrylonitrile loses its solubility in dimethylformamide, except when brought to a boil. An investigation of the properties of an acrylonitrile-vinyl acetate copolymer at temperatures ranging from 110-250C and pressures of 160-1000 kg/cm<sup>2</sup> revealed the existence of a minimum in the similarly obtained curves, the temperature of which corresponds to the one at which the copolymer loses its solubility in dimethylformamide. Orig. art. has: 2 charts.

ASSOCIATION: none

SUBMITTED: 27Jan62

DATE ACQ: 28Aug63

ENCL: 00

SUB CODE: CH

NO REF SOV: 004

OTHER: 005

Card 2/2

RAZUVAYEV, G.A.; MINSKER, K.S.; FEDOSEYEVA, G.T.; SHTARKMAN, B.P.

Heterogeneous catalytic polymerization of ethylene in the presence of  
the metal - metal chloride system. Voskom.soed. 5 no.9:1371-1375 S  
'63. (MIRA 17:1)

1. Nauchno-issledovatel'skiy institut khimii pri Gor'kovskom gosudarst-  
vennom universitete.

ARZHAKOV, S.A.; RYLOV, Ye.Ye.; SLONIMSKIY, G.L.; SHTARKMAN, B.P.

Role of thermal degradation in the compression molding of  
monolithic solids from powdered polymethyl methacrylate.  
Vysokom. soed. 5 no.10:1513-1519 0 '63. (MIRA 17:1)

ACCESSION NR: AP4007983

S/0190/63/005/012/1850/1853

AUTHORS: Razinskaya, I. N.; Kozlov, P. V.; Shtarkman, B. P.; Ignat'yeva, L. P.

TITLE: Intra- and interbundle plasticization of poly(vinyl chloride) interbundle

SOURCE: Vyssokomolekulyarnyye soyedineniya, v. 5, no. 12, 1963, 1850-1853

TOPIC TAGS: polymer, poly(vinyl chloride), polymerization, emulsion polymerization, bulk polymerization, plasticization, intrabundle plasticization, interbundle plasticization, mixed plasticization, plasticizer, primary supermolecular structure, supermolecular structure, secondary structure, bundle, glass transition temperature, PVC

ABSTRACT: The plasticization of polyvinylchloride (PVC) prepared by suspension polymerization (PF-4) and block polymerization has been investigated. The compounds used as plasticizers were: dioctylphthalate, ethylstearate, butylstearate, castor oil, and glycerine. The investigation was carried out by the thermomechanical method with specimens prepared from pressed powders. Three types of plasticization are shown for PVC: intrabundle, interbundle, and a combination of these two limiting types. Because of the greater effect of plasticization of PF-4 than

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ACCESSION NR: AP4007983

of the block polymer it has been suggested that the former is endowed with looser primary supermolecular structures. It has been shown that the plasticization effect is not changed qualitatively or quantitatively in all three types of plasticization on reprecipitation of PVC from dilute solution. This is ascribed to retention of the primary supermolecular structures (bundles) during this process. Orig. art. has: 1 figure.

ASSOCIATION: none

SUBMITTED: 22Jun62

DATE ACQ: 20Jan64

ENCL: 00

SUB CODE: MA

NO REF SOV: 006

OTHER: 000

Card 2/2

ARZHAKOV, S.A.; SLONIMSKIY, G.L.; SHTARKMAN, B.P.; KARGIN, V.A.

Temperature and pressure dependence of the specific volume  
of polymers. Part 1: Polymethyl methacrylate. Vysokom. soed.  
5 no.12:1854-1860 D '63. (MIRA 17:1)



L 11281-63

EPR/ENP(j)/EPF(g)/ENI(m)/BDS AFFIC/ASD PS-4/PO-4/PR-4

EM/WW

ACCESSION NR: AP3004432

8/0020/63/151/004/0898/0901

AUTHOR: Shtarkman, B. P.; Voyutskiy, S. S.; Kargin, V. A. (Academician)

TITLE: On the molecular mechanism of the autohesion of polymers with an ordered structure

SOURCE: AN BSSR. Doklady, v. 151, no. 4, 1963, 898-901

TOPIC TAGS: autohesion, polymer, supermolecular structure, diffusion adhesion theory, adhesive bond, polyethylene, poly(vinyl chloride), dibutyl sebacate, stripping test, adhesion work, glass-transition temperature, ordered structure, autohesion mechanism, contact layer, polymer structure, single crystal, band, bundle, macromolecular bundle, macromolecule mobility, supermolecular-structure stability

ABSTRACT: The autohesion of polymers with supermolecular structures has been studied from the standpoint of the diffusion theory of adhesion in order to determine the effect of these structures on the formation of adhesive bonds. Experiments were conducted with polyethylene (PE) and with poly(vinyl chloride) (PVC) plasticized with various amounts of dibutyl sebacate (DBS) and consisted in determining by stripping tests the dependence of the work of autohesion on

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L 14281-63

ACCESSION NR: AP3004432

such factors as bonding time, temperature, and plasticizer content. The results of the study, presented in Figs. 1-3 of the Enclosure in the form of plots of bonding time or temperature versus work of autohesion, indicate that autohesion sets in only at temperatures far above the glass-transition temperature ( $T_g$ ). This phenomenon is explained by the presence of strong supermolecular structures which hinder the free diffusion of macromolecules or their sections. It is concluded that the formation of autohesive bonds between two polymer layers requires preliminary abstraction of macromolecules from the supermolecular structures. The results also indicate the presence at temperatures above  $T_g$  of ordered structures which break up at higher temperatures. The mechanism of autohesion of polymers with an ordered structure consists in the diffusion migration of macromolecules from bundles of one layer to bundles of the other, leading to restoration of the normal polymer structure at the contact surface. As a result of this process cohesive strength is attained. It is noted that 1) the data obtained make it possible to follow the breaking up of supermolecular structures step-by-step (single crystals  $\rightarrow$  bands  $\rightarrow$  bundles  $\rightarrow$  macromolecules), and 2) the determination of the work of autohesion and its dependence on bonding time and temperature can become a convenient method for studying the mobility of macromolecules and the stability of supermolecular structures. Orig. art. has: 3 figures.

Card 2/62

ARZHAKOV, G.A.; MIRONENKO, G.I.; SHTAREMAN, B.P.

Effect of the relaxation of stresses on the formation of xerolite  
solids in the compression of powderlike polymethylmethacrylate.

Plast.massy no. 7:19-32 '61.

(MIRA 17:10)

RAZINSKAYA, I.N.; KOZLOV, P.V.; SHTARKMAN, B.P.

Investigating the viscosity of the melts of plasticized compositions  
of polyvinyl chloride. Plast.massy no.1:55-56 '64. (MIRA 17:6)

ACCESSION NR: AP4017628

S/0190/64/006/002/0189/0192

AUTHORS: Kargin, V. A.; Bort, D. N.; Shtarkman, B. P.; Minsker, K. S.

TITLE: Supramolecular structures arising directly in the polymerization process

SOURCE: Vyssokomolekulyarnyye soyedineniya, v. 6, no. 2, 1964, 189-192

TOPIC TAGS: polymerization, polymer, polyvinylchloride, polyethylene, super-molecular formation, catalyst, aluminum, chlorinated aluminum, tape formation, fibrillar formation, fagot, fibrillar orientation, solution, film, suspension, folded structure, crystalline structure

ABSTRACT: This investigation was conducted on crystalline polyvinylchloride (obtained in a butyraldehyde medium) and on polyethylene prepared in a benzene medium. In both instances partly chlorinated aluminum in combination with the alpha-alpha modification of titanium trichloride was used as catalyst. The obtained polyvinylchloride was dried, ground in a porcelain mortar, suspended in aqueous alcohol, spread on a collodion film, dried and subjected to examination on a Tesla-242M electron microscope at a 10 000-20 000 magnification. The polyethylene was split into fibers by means of a needle, and treated as in the preceding case. The electron microscopic picture of polyvinylchloride showed that the

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ACCESSION NR: AP4017628

particles consisted of fibrillar aggregate formations, the structure of which resembled accumulations of tapes and macrofagot packages. The authors assume that these structures were formed directly during the process of polymerization and were reconstructed only in the course of the subsequent procedure. Samples of polyethylene showed a similar structure but were more distinct. Here the tape formations revealed distinct transverse striations of folded fibers 150-200 Å in diameter. Another structural type of polyethylene was dendritic, seemingly growing from the bit of aluminum. Similar structures were also obtained from solution in ortho-xylene. Orig. art. has: 3 pictures.

ASSOCIATION: none

SUBMITTED: 30Jun62

SUB CODE: CH

DATE ACQ: 23Mar64

NO REF SOV: 018

ENCL: 00

OTHER: 003

Card 2/2

ACCESSION NR: APh030355

S/0190/64/006/003/0427/0431

AUTHORS: Razinskaya, I. N.; Shtarkman, B. P.; Kozlov, P. V.

TITLE: Investigation of the structural peculiarities of polyvinylchloride by means of the plasticization method

SOURCE: Vy\*sokomolekulyarny\*ye soyedineniya, v. 6, no. 3, 1964, 427-431

TOPIC TAGS: polymer, polyvinylchloride, polyvinylchloride latex, polyvinylchloride suspension, plasticization, plasticizer, dioctylphthalate, ethylstearate, physico-mechanical property, supermolecular structure

ABSTRACT: The effect of small amounts of plasticizers on the physico-mechanical properties of polyvinylchloride (obtained by various polymerization methods) was studied. Latex-type polyvinylchloride (LP) and suspension-type polyvinylchloride (SP) were moistened with an ethanol solution of dioctylphthalate (DP), followed by the evaporation of ethanol and heating at 100C for 1 hour. The obtained materials were pressed into blocks at  $65 \text{ kg/cm}^2$  and at a temperature of 150-165C; from these dumbbell-shaped test specimen were cut. It was found that the strength and elas-

Card 1/2

ACCESSION NR: AP4030355

ticity modulus of the SP samples went through a maximum at 5-8% DP, while the ultimate stretch showed under these conditions a slight dip, rising again when the concentration of the plasticizer reached 15%. In the LP polymer the strength and elasticity moduli decreased gradually with increased DP content up to 10-12%, following which there was a sharp drop. Experiments on the effect of ethylstearate on the vitrification temperature revealed for the SP polymer a maximum  $T_g$  lowering of 22C, as against 15C for the LP sample. These differences are attributed by the authors to a higher degree of structural orderliness in the LP polymer. Orig. art. has: 5 charts.

ASSOCIATION: none

SUBMITTED: 19Feb63

DATE ACQ: 07May64

ENCL: 00

SUB CODE: MA

NO REF SOV: 008

OTHER: 003

Card 2/2



RAZINSKAYA, I.N.; KOZLOV, P.V.; SHTARKMAN, B.P.

Dielectric properties of plasticized polyvinyl chloride.  
Vysokom. soed. 6 no.3:516-521 Mr'64. (MIRA 17:5)

ACCESSION NR: AP4010760

S/0020/64/154/001/0181/0183

AUTHOR: Arzhakov, S. A.; Zaynullin, S. Z.; Shtarkman, B. P.

TITLE: Method of determining polymer transition temperatures by powder deformation

SOURCE: AN SSSR. Doklady\*, v. 154, no. 1, 1964, 181-183

TOPIC TAGS: polymer, polymer transition, polymer transition temperature, polymer transition temperature determination, polymer powder deformation

ABSTRACT: A study of polymer transition temperatures by powder deformation is especially important because it permits tracing the powdered system over a wide temperature range, without converting the polymer specimen to a monolithic state. A method is developed for determining the polymer transition temperatures, with the special feature that the thermomechanical curve is plotted by the deformation of the polymer powder without making it into a block. The apparatus used is shown in Fig. 1 of the Enclosure. The powder was

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ACCESSION NR: AP4010760

compressed at a pressure of 320 kg/cm<sup>2</sup>; with subsequent reduction in load to 40 kg/cm<sup>2</sup>. The polymer is then heated at a rate of 1C per minute with the deformation determined over a specific temperature interval by an indicator with 0.01-mm graduations. The advantage of the method is its high sensitivity in the determination of the glass transition temperatures of crystalline polymers. "The authors thank Academician V. A. Kargin and Professor G. L. Slonimskiy for their interest in this study and for discussion of the results." Orig. art. has: 4 figures.

ASSOCIATION: none

SUBMITTED: 30Jul63

DATE ACQ: 10Feb64

ENCL: 01

SUB CODE: OC, GC

NO REF SOV: 004

OTHER: 000

Card 2/3

ACCESSION NR: AP4010760

ENCLOSURE: 01

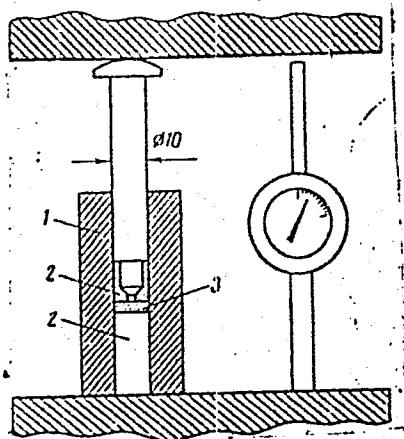


Fig. 1. Design illustrating the principle of the apparatus

1 - Die; 2 - plunger; 3 - point of temperature change.

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ACC NR: AR6000274 SOURCE CODE: UR/0081/65/000/014/S031/S032

AUTHORS: Popova, Z. V.; Tikhova, N. V.; Shtarkman, B. P.

TITLE: Effect of lead compounds on the thermal decomposition of polyvinyl chloride

SOURCE: Ref. zh. Khimiya, Abs. 14S200

REF SOURCE: Tr. po khimii i khim. tekhnol. (Gor'kiy), vyp. 2 (10), 1964, 322-325

TOPIC TAGS: lead compound, polyvinyl chloride, thermal decomposition, stabilizer

ABSTRACT: Interaction of  $Pb^{+2}$  and  $Pb^{+4}$  compounds with polyvinylchloride (PVC) upon heating in a neutral medium was investigated. Of the Pb compounds tested there were yellow (I) and red (II)  $PbO$ , a mixture of I and II with stearic acid (III),  $PbO_2$ ,  $PbCl_2$ , and Pb stearate (IV). It was shown that the effect of  $PbO$ ,  $PbO_2$ ,  $PbCl_2$ , and IV on the rate of thermal dehydrochlorination of PVC in an inert medium, as well as their HCl acceptor properties, are functions of the active  $O_2$  content in PVC.

Activity of I-IV differs when tested on the same sample of PVC. A true inhibition of thermal dehydrochlorination is observed upon heating PVC in the presence of I-IV in an inert medium; the length of the true induction period is independent of the acceptor properties of the additive. It is assumed that the effect of I-IV in stabilizing PVC is not limited to the suppression of the harmful effect of HCl.

L. Andreyev [Translation of abstract]

Card 1/1 SUB CODE: 07, 11

BALAKIRSKAYA, V.I.; SHTARKMAN, B.P.

Physical characteristics of powderlike polyvinyl chloride. Plast.  
massy no.9:62-64 '64. (MIRA 17:10)

L-24119-65 EPF(c)/EWP(j)/EWI(m)/T pc-4/pr-4 RM  
 ACCESSION NR: AP5003827 8/0190/65/007/001/0050/0054

AUTHOR: Bort, D. N.; Rylov, Ye. Ye.; Okladnov, N. A.; Shtarkman, B. P.; Kargin, V. A.

TITLE: Morphology of bulk poly(vinyl chloride)

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 1, 1965, 50-54

TOPIC TAGS: polymerization, bulk poly(vinyl chloride), supramolecular structure

ABSTRACT: The formation of supramolecular structures (morphological forms) in the course of polymerization and their development with an increasing degree of conversion has been studied during bulk polymerization of poly(vinyl chloride). The polymerization was conducted at 18—22C in ampoules which made sampling possible at any stage of polymerization. The structure of the sample and the particle size were determined by electron microscopy. Depending on the degree of conversion, the polymerization product was an opalescent liquid (traces of polymer), a white suspension (conversion, 1—25%), a gel (conversion, 25—60%), or a solid block (conversion, 60—90%). Electron micrographs

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L 24119-65

ACCESSION NR: AP5003827

indicate that the polymer is formed in spherical particles of approximately equal size. During polymerization the concentration of the particles remains constant, but the particles grow as a result of polymer formation on their surface and aggregate into a solid block. At first the block is not transparent because of the presence of a system of pores between the spherical particles. Further polymerization of the monomer between these particles results in the formation of a transparent region at the bottom of the block. The first supra-molecular structures appear when the concentration of macromolecules attains a critical value, at which time their association sets in. Orig. art. has: 7 figures. [B0]

ASSOCIATION: none

SUBMITTED: 02Mar64

ENCL: 00

SUB CODE: CC, GC

NO REF SOV: 003

OTHER: 000

ATD PRESS: 3176

Card 2/2



L 24120-65 EPF(c)/EPR/EWP(j)/EWT(m)/T/EWP(v) Pc-4/pr-4/ps-4 RM/WM  
 ACCESSION NR: AP5003835 S/0190/65/007/001/0135/0140

AUTHOR: Shtarkman, B. P.; Voyutskiy, S. S.; Kargin, V. A. B

TITLE: Cohesion of polyethylene

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 1, 1965, 135-140

TOPIC TAGS: crystalline polymer, polyethylene, cohesion, supramolecular structure

ABSTRACT: The cohesion of crystalline polymers has been studied with high- and low-pressure polyethylene (HPPE and LPPE) by stripping tests. The tests were conducted with polyethylene films doubled with fabrics and pressed between heated plates at  $0.5 \text{ kg/cm}^2$ . The effect of contact time and contact temperature (given a constant contact time) was determined. In order to establish the effect of supramolecular structures (morphology) on cohesion, the structure of the specimens was determined by x-ray diffraction and optical microscopy. The results of the study are given in the form of plots showing the relationship between cohesion and contact time, and cohesion and con-

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L 24120-65

ACCESSION NR: AP5003835

tact temperature (see Figs. 1—3 of the Enclosure). The breaks on the curves in Fig. 1 correspond to the melting points of HPPE (105C) and LPPE (130C). Appreciable cohesion appears for HPPE at 81C and for LPPE at 96C. Individual macromolecules in the stronger and better ordered supramolecular structures of LPPE are less free to diffuse from one film to another and to form cohesive bonds. The curves in Fig. 3 indicate that the cohesion of specimens having a fine supramolecular structure (without heat treatment) is higher than that of specimens having a coarse supramolecular structure (heat-treated specimens). However secondary supramolecular structures (spherulites) affect cohesion less than ordering within the primary supramolecular structures (or sheaves). Orig. art. has: 1 figure and 1 table. [B0]

ASSOCIATION: none

SUBMITTED: 25Mar64

ENCL: 02

SUB CODE: oc, cc

NO REF SOV: 011

OTHER: 003

ATD PRESS: 3176

Card 2/4

L 24120-65

ACCESSION NR: AP5003835

ENCLOSURE: 01

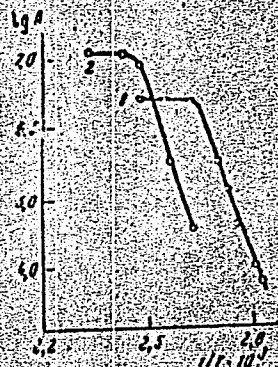


Fig. 1. Relationship between cohesion and contact temperature

1 - LPPE; 2 - HPPE.

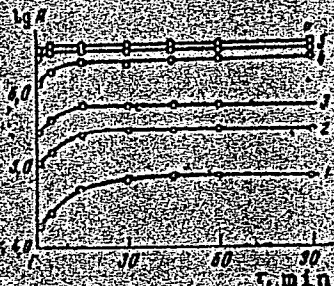


Fig. 2. Relationship between cohesion and contact time for HPPE. Temperature

1 - 95°C; 2 - 97°C; 3 - 100°C;  
4 - 103°C; 5 - 110°C; 6 - 120 to 130°C.

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L 24120-65  
ACCESSION NR: AP5003835

ENCLOSURE: 02

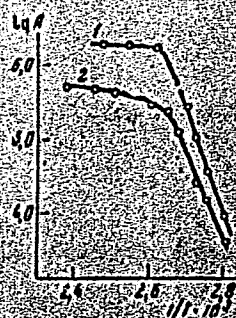


Fig. 3. Relationship between cohesion and contact temperature for HPPE.

1 - Without heat treatment;  
2 - after heat treatment.

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L-24121-65 EPF(c)/EPR/EWP(j)/EWI(m)/I/EWP(v) PC-4/Pr-4/PS-4 RM/WM  
 ACCESSION NR: AP5003836 S/0190/65/007/001/0141/0144 38

AUTHOR: Shtarkman, B. P.; Voyutskiy, S. S.; Kargin, V. A. 6

TITLE: Cohesion of polystyrene

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 1, 1965, 141-144

TOPIC TAGS: polystyrene, atactic polystyrene, isotactic polystyrene, amorphous polymer, crystalline polymer, cohesion, supramolecular structure

ABSTRACT: The cohesion of amorphous and crystalline isotactic polystyrene (IPS) and of atactic polystyrene (APS) has been studied at room temperature by stripping tests in bonded polystyrene films. In order to establish the effect of supramolecular structures (morphological forms) on cohesion, the structures of the specimens were determined by x-ray diffraction and electron and optical microscopy. The results of the study are given in a form which shows the relationship between the cohesion and banding temperature (see Fig. 1 of the Enclosure). A study of the results showed that the bonding temperature at which cohesion commences is: for APS, 78-80C; for amorphous

Card 1/3



L 24121-65

ACCESSION NR: AP5003836

IPS, 90—92C; and for crystalline IPS, 157—160C. The relatively poorer cohesion of crystalline IPS was attributed to the higher degree of ordering of its primary supramolecular structures and to the formation of spherulites. Amorphous IPS exhibits lower cohesion than APS because the structure of amorphous IPS has a higher degree of order in the amorphous state owing to the high regularity of the IPS backbone. Orig. art. has: 6 figures. [B0]

ASSOCIATION: none

SUBMITTED: 25Mar64

ENCL: 01

SUB CODE: OC, 6C

NO REF SOV: 007

OTHER: 001

ATD PRESS: 3176

Card 2/3

L-24121-65

ACCESSION NR: AP5003836

ENCLOSURE: 01

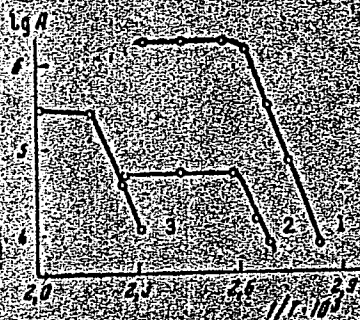


Fig. 1. Relationship between the cohesion and the bonding temperature

1 - Atactic polystyrene; 2 - amorphous isotactic polystyrene; 3 - crystalline isotactic polystyrene.

Card 3/3

L 35477-65 EWT(m)/EPF(c)/EWP(j) Pc-4/Pr-4 RM

ACCESSION NR: AP5005603

S/0190/65/007/002/0333/0338

AUTHORS: Lebedev, V. P.; Darlyukova, L. Ye.; Razinskaya, I. N.; Okladnov, N. A.; Shtarkman, B. P.

TITLE: The effect of low plasticizer concentrations on the ordering of polyvinylchloride structure

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 2, 1965, 333-338

TOPIC TAGS: polyvinylchloride, plasticizer, IR spectrometer, x ray analysis/ IKS 14 spectrometer, URS 50 diffractometer

ABSTRACT: The authors studied the properties of polyvinylchloride containing various proportions of plasticizer by two methods: infrared spectrometry and x-ray analysis. The infrared spectrum was obtained on an automatic two-beam IKS-14 spectrometer with short-wave filter. Samples were prepared in three different ways. X-ray studies of powdered plasticized polyvinylchloride were made on a URS-50 diffractometer with a Geiger counter.  $\text{CuK}\alpha$  radiation was employed with a quartz monochromator. Dioctylphthalate was used as the plasticizer. Results show that the degree of ordering passes through a maximum at a plasticizer

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L 35477-65

ACCESSION NR: AP5005603

content of 10-15%. Structural studies of the polyvinylchloride in comparison with the physical properties show that at this percentage of plasticizer the strength and the elasticity modulus reach maximums and the elongation at rupture reaches a minimum. Increased rigidity of polyvinylchloride with the introduction of relatively small amounts of plasticizer is therefore considered to be due to increase in degree of ordering in the structure. Orig. art. has: 5 figures.

ASSOCIATION: Institut khlororganicheskikh produktov i akrilato (Institute of Organic Chloride Products and Acrylates)

SUBMITTED: 26Apr64

ENGL: 00

SUB CODE: OC, MT

NO REF SOV: 008

OTHER: 005

Card 2/2

LEBEDEV, V.P.; OKLADNOV, N.A.; MINSKER, K.S.; SHTARKMAN, B.P.

X-ray diffraction study of polyvinyl chloride. Vysokom.  
soed. 7 no.4:655-660 Ap '65. (MIRA 18:6)

1. Institut khlororganicheskikh produktov i akrilatov,  
Dzerzhinsk. *Handwritten: Dzerzhinsk*

L 29934-65 EPF(c)/ENP(j)/ENT(m)/T Pc-4/Pr-4 RM

ACCESSION NR: AP5004608

8/0020/65/160/002/0413/0415

AUTHOR: Bort, D.N.; Okladnov, N.A.; Shtarkman, B.P.; Vidvaykina, L.I.

TITLE: Electron-microscopic study of structures arising during the polymerization and processing of polyvinyl chloride produced by block and suspension polymerization

SOURCE: AN SSSR. Doklady, v. 160, no. 2, 1965, 413-415

TOPIC TAGS: polyvinylchloride, block polymerization, suspension polymerization, electron microscopy, polymer structure

ABSTRACT: Structures of polyvinyl chloride formed in the course of block and suspension polymerization as well as structures arising during its further processing were investigated by means of the electron microscope. Block polymerization was carried out in ampoules provided with a special device permitting the withdrawal of polymer samples at any stage of the process without interrupting it. Initiation was with the usual peroxide-type initiators. It was shown that in the course of free-radical block and suspension polymerization, supermolecular structures of a globular type are formed. The processing of polyvinyl chloride leads to a thorough transformation of the structure: the globular structures are converted into fibrillar ones. Therefore, the authors conclude that the main purpose of the processing of polyvinyl chloride and similar polymers should be a

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L 29934-65

ACCESSION NR: AP5004603

complete and uniform rearrangement of the original globular structure into a fibrillar system, which imparts high physicochemical properties to the material. Orig. art. has: 3 figures.

ASSOCIATION: none

SUBMITTED: 08Sep64

ENCL: 00

SUB CODE: GC, EC

NO REF SOV: 001

OTHER: 000

Card 2/2

L 51705-65 EWT(m)/EPF(c)/EPA(w)-2/ENF(j)/T PC-1/Pab-10/Pr-J/ WH/WM/RM  
 ACCESSION NR: AP5014520 UR/0069/65/027/003/0307/0310 39  
 541.64:539.24 38  
 B

AUTHOR: Balakirskaya, V. L.; Shtarkman, B. P.

TITLE: Morphological inhomogeneity of suspension type polyvinyl chloride

SOURCE: Kolloidnyy zhurnal, v. 27, no. 3, 1965, 307-310

TOPIC TAGS: polyvinyl chloride, particle size, density determination

ABSTRACT: Particles which are conglomerates of primary polymer seeds are formed during the suspension polymerization of vinyl chloride. This work was concerned with the study of the structure of the individual particles and the morphological homogeneity of suspension type polyvinyl chloride. The structure of polyvinyl chloride particles of known density was studied by the microsection technique. The density of particles was determined by the flotation method. It was shown that the morphological characteristics of the polyvinyl chloride particle are characterized by its density. Polyvinyl chloride particles containing pores open at both ends are of high density ranging from 1.43 to 1.40. As the particle size and the number of pores decrease the density also decreases. The density of particles with closed pores is 1.25-1.20. Microscopic studies showed that polyvinyl

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L-54705-65

ACCESSION NR: AP5014520

chloride powders are morphologically heterogeneous. The heterogeneity was also determined from the density distribution curve, the standard deviation of which was taken as the measure of heterogeneity. The particle density of polyvinyl chloride suspension and its morphological heterogeneity is evident in the technological behavior of suspensions. This is extremely noticeable in the production of items containing plasticizers. This is explained by the fact that the plasticizer is distributed uniformly and simultaneously in morphologically homogeneous specimens. If particles of polyvinyl chloride also contain large open pores, the plasticizer can easily penetrate them in cold suspension and upon heating produce a simultaneously uniform gelation. This in turn results in high quality products. Orig. art. has: 3 figures and 1 table.

ASSOCIATION: Institut khlororganicheskikh produktov i akrilatov (Institute of Chlorine-Organic Products and Acrylates)

SUBMITTED: 09Dec63

ENCL: 00

SUB CODE: 00

NO REF SOV: 001

OTHER: 004

Card 2/2



L 20442-56 EWT(m)/EWP(j) RM  
 ACC NR: AP6010105 (A) SOURCE CODE: UR/0190/66/008/003/0390/0394

AUTHOR: Vidyaykina, L. I.; Okladnov, N. A.; Shtarkman, B. P. 24  
 B

ORG: Scientific Research Institute of Chloroorganic Products and Acrylates (Nauchno-  
 issledovatel'skiy institut khlororganicheskikh produktov i akrilatov) 15

TITLE: Formation of supramolecular structures in the process of milling of poly-  
 (vinyl chloride)

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 8, no. 3, 1966, 390-394

TOPIC TAGS: polyvinyl chloride, morphological form, globule, fibril, milling,  
 supramolecular structure

ABSTRACT: A study has been made of the formation of supramolecular structures  
 (morphological forms) on milling of suspension-polymerized poly(vinyl chloride) 15  
 (PVC). It was found that the initial PVC has a "macrolobular" structure. The  
 macroglobules (~1  $\mu$ ) consist of [aggregated] "microglobules" ( $\leq 0.1 \mu$ ). Milling  
 first causes disaggregation of macroglobules into microglobules, and then, formation  
 of fibrillar structures. The degree of development of the fibrillar structures  
 depends on the milling method. Fibrils of the highest perfection were obtained in  
 unidirectionally milled films. The fibrils formed are anisotropic as indicated  
 by x-ray patterns. Orig. art. has: 15 figures. [B0]

SUB CODE: 07, 11/ SUBM DATE: 22Feb65/ ORIG REF: 002/ OTH REF: 001/ ATD PRESS:  
 Card 1/1 BK UDC: 678.01:53 4222

L 41186-66 EMT(m)/I/ENP(J) IJP(c) WW/RM

ACC NR: AP6023428 (A)

SOURCE CODE: UR/0190/66/008/007/1190/1195

AUTHOR: Okladnov, N. A.; Razinskaya, I. N.; Shtarkman, B. P.

ORG: Institute of Chlorinated Organic Products and Acrylates (Institut khlororganicheskikh produktov i akrilatov)

TITLE: Study of the mechanism of plasticization of crystalline vinylidene chloride vinyl chloride/copolymer

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 8, no. 7, 1966, 1190-1195

TOPIC TAGS: plasticizer, vinyl chloride, copolymer, vinylidene chloride, crystalline polymer

ABSTRACT: The mechanism of plasticization of "<sup>15</sup>saran," a crystalline copolymer of vinylidene chloride and vinyl chloride of the composition 89:11, was studied by the method of powder thermomechanics and differential thermal analysis. The plasticizers used were dibutyl sebacate, dibutyl phthalate, and ethyl ethoxyethylphthalate. It is shown that up to a certain maximum concentration, the mole fraction rule is obeyed, i. e., the plasticization follows the molecular mechanism. Departures from this rule are explained by the contribution made by supermolecular formations (which interact with the plasticizer via an interstructural mechanism) to the plasticizing effect. It is shown that the plasticized copolymer retains a crystalline structure which does not change appreciably during plasticization. It is postulated that the plasticizer penetrates chiefly into the amorphous part of the copolymer, and that the absence of a lin

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UDC: 678.01:53+678.13+678.743